

WHAT IS CLAIMED IS:

1. Seed of rice inbred line designated R031001, representative seed of said line having been deposited under ATCC Accession No. PTA-_____.
2. A rice plant, or a part thereof, produced by growing the seed of claim 1.
3. The rice plant of claim 2, wherein said plant has been emasulated.
4. A tissue culture of regenerable cells produced from the plant of claim 2.
5. Protoplasts produced from the tissue culture of claim 4.
6. The tissue culture of claim 4, wherein cells of the tissue culture are from a tissue selected from the group consisting of leaf, pollen, embryo, root, root tip, anther, flower, grain, glume and stem.
7. A rice plant regenerated from the tissue culture of claim 4, said plant having all the morphological and physiological characteristics of inbred line R031001, representative seed of said line having been deposited under ATCC Accession No. PTA-_____.
8. A method for producing an F1 hybrid rice seed, comprising crossing the plant of claim 2 with a different rice plant and harvesting the resultant F1 hybrid rice seed.
9. A hybrid rice seed produced by the method of claim 8.
10. A hybrid rice plant, or parts thereof, produced by growing said hybrid seed of claim 9.
11. A method for producing a male sterile rice plant comprising transforming the rice plant of claim 2 with a nucleic acid molecule that confers male sterility.
12. A male sterile rice plant produced by the method of claim 11.
13. A method of producing an herbicide resistant rice plant comprising transforming the rice plant of claim 2 with a transgene that confers herbicide resistance.
14. An herbicide resistant rice plant produced by the method of claim 13.
15. The rice plant of claim 14, wherein the transgene confers resistance to an herbicide selected from the group consisting of: imidazolinone, sulfonylurea, glyphosate, glufosinate, L-phosphinothricin, triazine and benzonitrile.

16. A method of producing an insect resistant rice plant comprising transforming the rice plant of claim 2 with a transgene that confers insect resistance.
17. An insect resistant rice plant produced by the method of claim 16.
18. The rice plant of claim 17, wherein the transgene encodes a *Bacillus thuringiensis* endotoxin.
19. A method of producing a disease resistant rice plant comprising transforming the rice plant of claim 2 with a transgene that confers disease resistance.
20. A disease resistant rice plant produced by the method of claim 19.
21. A method of producing a rice plant with modified fatty acid metabolism or modified carbohydrate metabolism comprising transforming the rice plant of claim 2 with a transgene encoding a protein selected from the group consisting of stearyl-ACP desaturase, fructosyltransferase, levansucrase, alpha-amylase, invertase and starch branching enzyme.
22. A rice plant produced by the method of claim 21.
23. The rice plant of claim 22 wherein the transgene confers a trait selected from the group consisting of increased amylose starch.
24. A rice plant, or part thereof, having all the physiological and morphological characteristics of the inbred line R031001, representative seed of said line having been deposited under ATCC Accession No. PTA-_____.
25. A method of introducing a desired trait into rice inbred line R031001 comprising:
 - (a) crossing R031001 plants grown from R031001 seed, representative seed of which has been deposited under ATCC Accession No. PTA-_____, with plants of another rice line that comprise a desired trait to produce F1 progeny plants, wherein the desired trait is selected from the group consisting of male sterility, herbicide resistance, insect resistance, disease resistance and any lose starch;
 - (b) selecting F1 progeny plants that have the desired trait to produce selected F1 progeny plants;

- (c) crossing the selected progeny plants with the R031001 plants to produce backcross progeny plants;
- (d) selecting for backcross progeny plants that have the desired trait and physiological and morphological characteristics of rice inbred line R031001 listed in Table 1 to produce selected backcross progeny plants; and
- (e) repeating steps (c) and (d) three or more times in succession to produce selected fourth or higher backcross progeny plants that comprise the desired trait and all of the physiological and morphological characteristics of rice inbred line R031001 listed in Table 1 as determined at the 5% significance level when grown in the same environmental conditions.

26. A plant produced by the method of claim 25, wherein the plant has the desired trait and all of the physiological and morphological characteristics of rice inbred line R031001 listed in Table 1 as determined at the 5% significance level when grown in the same environmental conditions.

27. The plant of claim 26 wherein the desired trait is herbicide resistance and the resistance is conferred to an herbicide selected from the group consisting of: imidazolinone, sulfonylurea, glyphosate, glufosinate, L-phosphinothricin, triazine and benzonitrile.

28. The plant of claim 26 wherein the desired trait is insect resistance and the insect resistance is conferred by a transgene encoding a *Bacillus thuringiensis* endotoxin.

29. The plant of claim 26 wherein the desired trait is male sterility and the trait is conferred by a cytoplasmic nucleic acid molecule that confers male sterility.

30. A method of modifying fatty acid metabolism, modified phytic acid metabolism or modified carbohydrate metabolism into rice inbred line R031001 comprising:

- (a) crossing R031001 plants grown from R031001 seed, representative seed of which has been deposited under ATCC Accession No. PTA-_____, with plants of another rice line that comprise a nucleic acid molecule encoding an enzyme selected from the group consisting of phytase, stearyl-

ACP desaturase, fructosyltransferase, levansucrase, alpha-amylase, invertase and starch branching enzyme;

- (b) selecting F1 progeny plants that have said nucleic acid molecule to produce selected F1 progeny plants;
- (c) crossing the selected progeny plants with the R031001 plants to produce backcross progeny plants;
- (d) selecting for backcross progeny plants that have said nucleic acid molecule and physiological and morphological characteristics of rice inbred line R031001 listed in Table 1 to produce selected backcross progeny plants; and
- (e) repeating steps (c) and (d) three or more times in succession to produce selected fourth or higher backcross progeny plants that comprise said nucleic acid molecule and have all of the physiological and morphological characteristics of rice inbred line R031001 listed in Table 1 as determined at the 5% significance level when grown in the same environmental conditions.

31. A plant produced by the method of claim 30, wherein the plant comprises the nucleic acid molecule and has all of the physiological and morphological characteristics of rice inbred line R031001 listed in Table 1 as determined at the 5% significance level when grown in the same environmental conditions.